

BELLCOMM, INC.

955 L'ENFANT PLAZA NORTH, S.W.

WASHINGTON, D. C. 20024

B69 C7082

SUBJECT: Voice System Performance Observations DATE: July 28, 1969
Made at CDSC/KSC During Launch of
Apollo 11, July 15-16, 1969 - Case 900 FROM: J. J. Hibbert
B. F. O'Brien

ABSTRACT

As part of the monitoring of voice communications systems during the Apollo 11 mission, certain critical circuits were monitored at the Communications Distribution and Switching Center at KSC. The results of this monitoring are summarized and show that the performance of the voice circuits supported the mission quite adequately with only minor problems.



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MEMORANDUM FOR FILE

During the launch countdown of Apollo 11, the performance of several of the OIS channels, VHF and USB radio links with the spacecraft and Net 1 after launch were monitored at the Communications Distribution and Switching Center (CD&SC) at KSC by the writers. In general, the performance of these circuits as monitored between 9:15 EDT on July 15 and 13:10 EDT on July 16, was quite good during this countdown. The channels available for monitoring were OIS channels 111, 112, 117, 121, 212, 214, Astrolaunch, VHF uplink, VHF downlink, USB uplink and USB downlink.

The significant anomalies noted prior to lift-off were:

- (1) The noise level on Channels 111, 212 and 214 on July 15, 1969, was louder than had been reported during the Apollo 11 CDDT. The noise was usually quite tolerable, except for occasional and rare strong, short noise bursts which affected all OIS channels as on July 15 at 19:16 EDT. [The source of this noise was looked for several times during the countdown. It did not reappear after connectors of some modules in the OIS modem rack were cleaned during trouble shooting. SO-COM, however, is not sure that this was definitely the cause of the noise bursts as they were transient in character.]
- (2) During the spacecraft/GMIL RF tests on July 15, the prime VHF transmitter at GMIL transmitted a spurious tone.
- (3) A few occurrences of OIS crosstalk were noted, e.g., at 22:05 on July 15 and 03:40 on July 16, Channel 121 was crosstalking into Channel 111. Crosstalk occurred on Channel 111 at 06:45 on July 16.
- (4) An OIS problem at the Pad at 02:53 EDT held up the LH₂ loading until 03:15 EDT (July 16).

(NASA-CR-106552) VOICE SYSTEM PERFORMANCE
OBSERVATIONS MADE AT CDSC/KSC DURING LAUNCH
OF APOLLO 11, 15-16 JULY 1969 (Bellcomm,
Inc.) 3 p

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- (5) Voice levels were generally good and equal (at the monitoring point), with the exception that HFLT was occasionally low in level.
- (6) In the last communication check before launch, the Astrocomm console was configured so that the VHF channel with the spacecraft did not appear on Channel 214. This was quickly cleared and the test conductor was then given a "go" by the Communications Systems Engineer (CSE).
- (7) During the radio frequency checks with the CSM at 7:34 EDT on July 16, both the uplink and downlink sides of the conversation between the Spacecraft Test Conductor (MSTC) and the astronauts could be heard on the VHF downlink. Also at 08:02, MSTC was heard on both USB up and USB down, while CDR was heard on USB down and VHF up at 08:02 and on VHF up and down at 08:22. The low return loss on the down radio voice circuits with the spacecraft was probably the most significant problem encountered during the Apollo 11 launch countdown.

The post lift-off voice communications were monitored in the audio-visual theater at CDSC until T+6 minutes. The communications over the Astrolaunch circuit were loud and clear. The launch phase announcements corresponded to the Flight Plan with no problems evident. Indeed, both MCC and the spacecraft crew remarked that "communications sounds good."

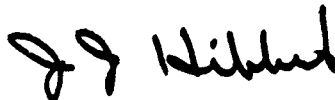
Net 1 was subsequently monitored in the CD&SC control room until T+3^h40^m. During this period, the voice communications with Apollo 11 in general was good. On the first revolution, however, the voice relay via Tananarive was noisy but readable although MCC called it "loud and clear."

Television was scheduled, as a late requirement, to be received at GDS on the first revolution but it was not received satisfactorily. The contact time with GDS on this revolution was short, only about one minute, which contributed to the problem. MCC later reported to Apollo 11 that its television signal had been received and recorded at GMIL. This was later found to be of unacceptable quality.

On the second pass over the ARIS Vandenberg, the relayed astronaut's voice was noisy and distorted and sounded more like an HF link than an Intelsat link. The voice relays through ARIA 4 and ARIA 3 were successful and of good quality

although ARIA 3 relay was the better. After injection from T+3^h22^m to T+3^h30^m, MCC was unable to communicate with Apollo 11. This was ascribed to spacecraft antenna problems, including acquisition by the High Gain Antenna.

Despite these minor problems the voice circuit performance was generally quite acceptable and did support the mission adequately.



J. J. Hibbert

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BFO-drc


B. F. O'Brien

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From: J. J. Hibbert
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